

# SmartLabs, Inc.

## TEST REPORT FOR

**On/Off Outdoor Module  
Model: 2634-222**

### Tested To The Following Standards:

**FCC Part 15 Subpart C Sections 15.249  
and  
RSS 210 Issue 8**

**Report No.: 93569-3**

**Date of issue: October 18, 2012**



This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of EMC testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

**TABLE OF CONTENTS**

Administrative Information ..... 3

    Test Report Information ..... 3

    Report Authorization ..... 3

    Test Facility Information ..... 4

    Site Registration & Accreditation Information ..... 4

    Summary of Results ..... 5

    Conditions During Testing ..... 5

    Equipment Under Test ..... 6

    Peripheral Devices ..... 6

FCC Part 15 Subpart C ..... 7

    15.31(e) Voltage Variations ..... 7

    15.207 AC Conducted Emissions ..... 9

    15.249(a) RF Power Output ..... 16

    -20dBc Occupied Bandwidth / RSS-210 99% Bandwidth ..... 19

    Bandedge ..... 22

    15.249(d) Radiated Spurious Emissions ..... 27

Supplemental Information ..... 34

    Measurement Uncertainty ..... 34

    Emissions Test Details ..... 34

## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

SmartLabs, Inc.  
16542 Millikan Ave.  
Irvine, CA 92606

Representative: John Lockyer  
Customer Reference Number: 12-3JL0926

**DATE OF EQUIPMENT RECEIPT:**

**DATE(S) OF TESTING:**

**REPORT PREPARED BY:**

Dianne Dudley  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 93569

October 16, 2012

October 16, 2012

### Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the sample equipment tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



**Steve Behm**  
*Director of Quality Assurance & Engineering Services*  
*CKC Laboratories, Inc.*

## Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):  
CKC Laboratories, Inc.  
110 Olinda Place  
Brea, CA 92823

## Site Registration & Accreditation Information

Location	CB #	Taiwan	Canada	FCC	Japan
Brea A	US0060	SL2-IN-E-1146R	3082D-1	90473	R-2945 C-3248 T-1572

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15 Subpart C 15.249 and RSS 210 Issue 8

Description	Test Procedure/Method	Results
Voltage Variation	FCC Part 15 Subpart C Section 15.31(e)	Pass
Conducted Emissions	FCC Part 15 Subpart C Section 15.207 / ANSI C63.4 (2003)	Pass
RF Power Output	FCC Part 15 Subpart C Section 15.249(a)	Pass
-20dBc / 99% Occupied Bandwidth	FCC Part 15 Subpart C Section 15.249 / RSS 210 Issue 8	Pass
Bandedge	FCC Part 15 Subpart C Section 15.249	Pass
Radiated Spurious Emissions	FCC Part 15 Subpart C Section 15.249(d)	Pass

## Conditions During Testing

This list is a summary of the conditions noted for or modifications made to the equipment during testing.

Summary of Conditions
Modification during testing: Drop one fundamental power level.

## EQUIPMENT UNDER TEST (EUT)

### EQUIPMENT UNDER TEST

#### On/Off Outdoor Module

Manuf: SmartLabs, Inc.

Model: 2634-222

Serial: 14.A2.F7

### PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

#### Light Bulb

Manuf: Sylvania

Model: SYL 7.6W

Serial: NA

## FCC PART 15 SUBPART C

This report contains EMC emissions test results under United States Federal Communications Commission (FCC) 47 CFR 15C requirements for Unlicensed Radio Frequency Devices, Subpart C - Intentional Radiators.

### 15.31(e) Voltage Variations

#### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**

Specification: **15.31e**

Work Order #: **93569** Date: 10/16/2012

Test Type: **Maximized Emissions** Time: 11:24:57

Equipment: **On/Off Outdoor Module** Sequence#: 6

Manufacturer: SmartLabs, Inc. Tested By: Don Nguyen

Model: 2634-222

S/N: NA

***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T2	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

***Support Devices:***

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

***Test Conditions / Notes:***

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is installed in fixed position. EUT is connected to support light bulb. The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

Frequency range of measurement = fundamental

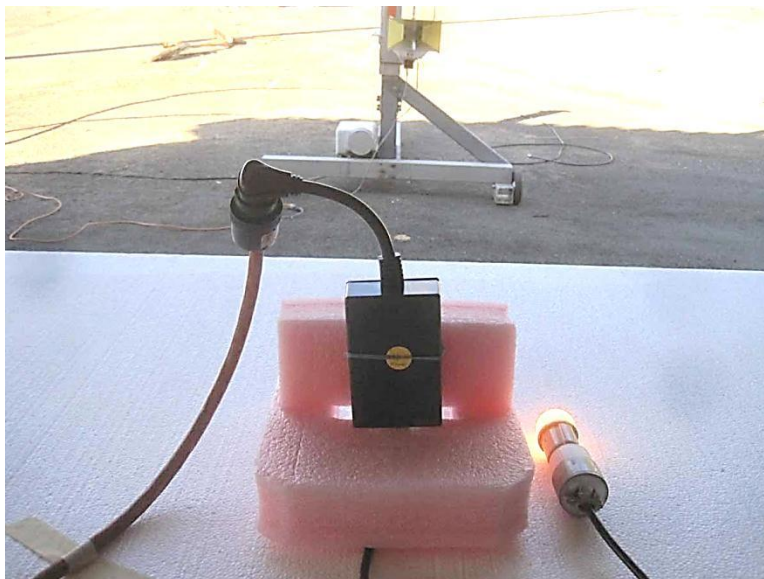
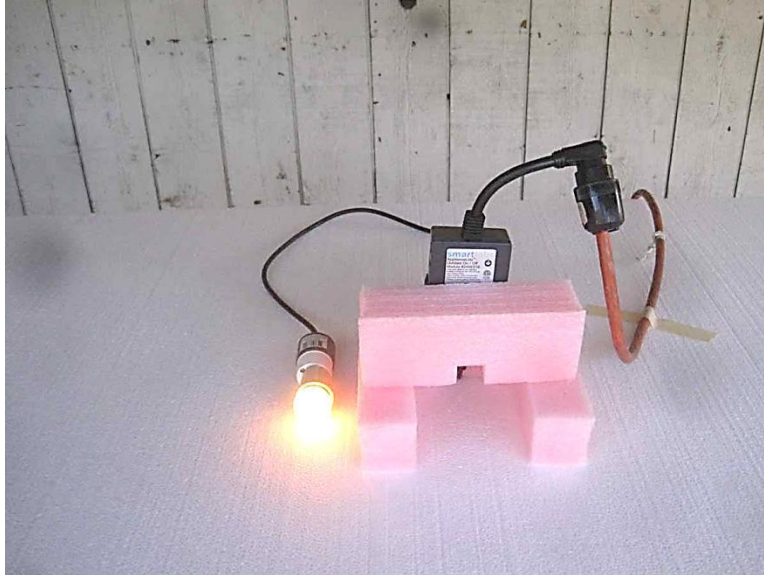
Test environment conditions: 22°C, 42% relative humidity, 100kPa

OATS: site A

Modification: Drop one fundamental power level.

15.31(e) compliance: the supply voltage was varied between 85% and 115% of the nominal rated supply voltage (120 Vac), no change in the fundamental signal level was observed.

**Test Setup Photos**





**15.207 AC Conducted Emissions**

**Test Data Sheets**

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**  
 Specification: **15.207 AC Mains - Average**  
 Work Order #: **93569** Date: 10/16/2012  
 Test Type: **Conducted Emissions** Time: 15:14:54  
 Equipment: **On/Off Outdoor Module** Sequence#: 10  
 Manufacturer: SmartLabs, Inc. Tested By: Don Nguyen  
 Model: 2634-222 120V 60Hz  
 S/N: 14.A2.F7

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06084	Attenuator	SA18N10W-06	12/8/2010	12/8/2012
T2	ANP04358	Cable	RG142	4/10/2012	4/10/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
T4	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	12/21/2010	12/21/2012
	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	12/21/2010	12/21/2012

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

**Support Devices:**

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

**Test Conditions / Notes:**

The EUT is placed on the wooden table. EUT is installed in fixed position. EUT is connected to support light bulb. The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

Frequency range of measurement = 150kHz-30MHz  
 RBW=VBW=9kHz

Test environment conditions: 24°C, 42% relative humidity, 100kPa  
 OATS: site A

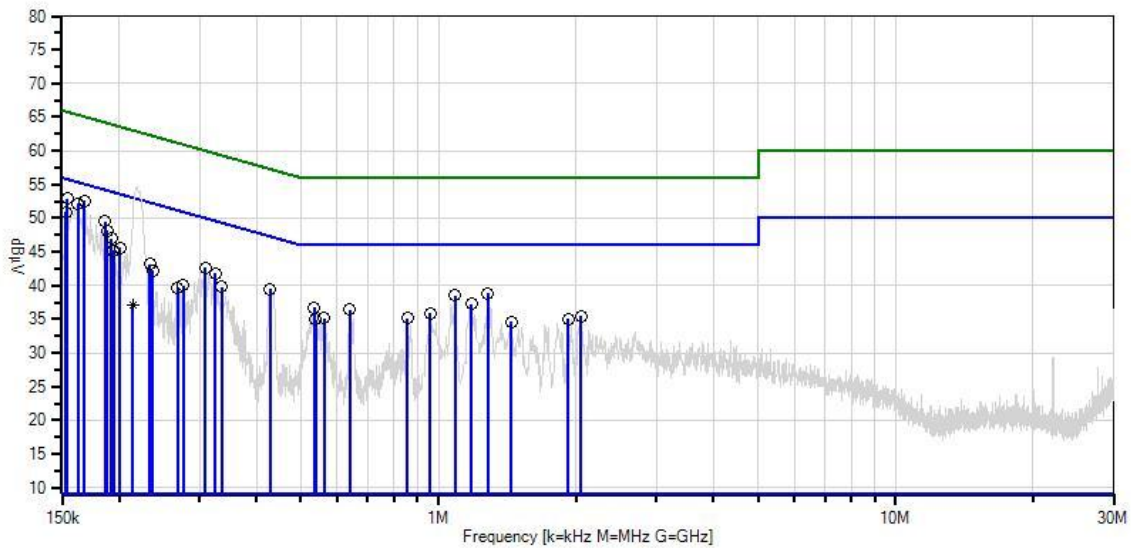
Modification: Drop one fundamental power level.

Ext Attn: 0 dB

<b>Measurement Data:</b>		Reading listed by margin.						Test Lead: L1(L)				
#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V	Spec dB $\mu$ V	Margin dB	Polar Ant	
1	168.179k	46.4	+5.8	+0.0	+0.4	+0.0	+0.0	52.6	55.0	-2.4	L1(L)	
2	154.362k	45.7	+5.8	+0.0	+1.4	+0.0	+0.0	52.9	55.8	-2.9	L1(L)	
3	162.362k	45.9	+5.8	+0.0	+0.5	+0.0	+0.0	52.2	55.3	-3.1	L1(L)	
4	186.359k	43.5	+5.8	+0.0	+0.2	+0.0	+0.0	49.5	54.2	-4.7	L1(L)	
5	152.908k	43.5	+5.8	+0.0	+1.6	+0.0	+0.0	50.9	55.8	-4.9	L1(L)	
6	188.541k	42.1	+5.8	+0.0	+0.2	+0.0	+0.0	48.1	54.1	-6.0	L1(L)	
7	192.177k	41.0	+5.8	+0.0	+0.2	+0.0	+0.0	47.0	53.9	-6.9	L1(L)	
8	1.281M	32.7	+5.8	+0.1	+0.2	+0.0	+0.0	38.8	46.0	-7.2	L1(L)	
9	309.257k	36.7	+5.7	+0.1	+0.2	+0.0	+0.0	42.7	50.0	-7.3	L1(L)	
10	1.086M	32.4	+5.8	+0.1	+0.2	+0.0	+0.0	38.5	46.0	-7.5	L1(L)	
11	324.528k	35.8	+5.7	+0.1	+0.2	+0.0	+0.0	41.8	49.6	-7.8	L1(L)	
12	428.519k	33.5	+5.7	+0.1	+0.2	+0.0	+0.0	39.5	47.3	-7.8	L1(L)	
13	200.903k	39.6	+5.8	+0.0	+0.2	+0.0	+0.0	45.6	53.6	-8.0	L1(L)	
14	194.359k	39.2	+5.8	+0.0	+0.2	+0.0	+0.0	45.2	53.8	-8.6	L1(L)	
15	1.179M	31.2	+5.8	+0.1	+0.2	+0.0	+0.0	37.3	46.0	-8.7	L1(L)	
16	233.628k	37.2	+5.8	+0.0	+0.2	+0.0	+0.0	43.2	52.3	-9.1	L1(L)	
17	533.964k	30.7	+5.8	+0.0	+0.2	+0.0	+0.0	36.7	46.0	-9.3	L1(L)	
18	335.437k	33.8	+5.7	+0.1	+0.2	+0.0	+0.0	39.8	49.3	-9.5	L1(L)	
19	640.136k	30.4	+5.8	+0.0	+0.2	+0.0	+0.0	36.4	46.0	-9.6	L1(L)	
20	236.537k	36.2	+5.8	+0.0	+0.2	+0.0	+0.0	42.2	52.2	-10.0	L1(L)	
21	958.007k	29.8	+5.8	+0.1	+0.2	+0.0	+0.0	35.9	46.0	-10.1	L1(L)	
22	2.047M	29.4	+5.8	+0.1	+0.2	+0.0	+0.0	35.5	46.0	-10.5	L1(L)	
23	276.533k	34.0	+5.8	+0.0	+0.2	+0.0	+0.0	40.0	50.9	-10.9	L1(L)	
24	561.598k	29.1	+5.8	+0.0	+0.2	+0.0	+0.0	35.1	46.0	-10.9	L1(L)	

25	853.934k	29.0	+5.8	+0.1	+0.2	+0.0	+0.0	35.1	46.0	-10.9	L1(L)
26	1.919M	28.9	+5.8	+0.1	+0.2	+0.0	+0.0	35.0	46.0	-11.0	L1(L)
27	538.327k	28.9	+5.8	+0.0	+0.2	+0.0	+0.0	34.9	46.0	-11.1	L1(L)
28	1.443M	28.5	+5.8	+0.1	+0.2	+0.0	+0.0	34.6	46.0	-11.4	L1(L)
29	268.534k	33.7	+5.8	+0.0	+0.2	+0.0	+0.0	39.7	51.2	-11.5	L1(L)
30	214.214k	31.0	+5.8	+0.0	+0.2	+0.0	+0.0	37.0	53.0	-16.0	L1(L)
Ave											
^	218.356k	48.8	+5.8	+0.0	+0.2	+0.0	+0.0	54.8	52.9	+1.9	L1(L)
^	214.214k	48.8	+5.8	+0.0	+0.2	+0.0	+0.0	54.8	53.0	+1.8	L1(L)

CKC Laboratories, Inc. Date: 10/16/2012 Time: 15:14:54 SmartLabs, Inc. WO#: 93569  
 15.207 AC Mains - Average Test Lead: L1(L) 120V 60Hz Sequence#: 10 Ext ATTN: 0 dB



- Sweep Data
- Peak Readings
- \* Average Readings
- 1 - 15.207 AC Mains - Average
- Readings
- × QP Readings
- ▼ Ambient
- 2 - 15.207 AC Mains - Quasi-peak

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**  
 Specification: **15.207 AC Mains - Average**  
 Work Order #: **93569**  
 Test Type: **Conducted Emissions**  
 Equipment: **On/Off Outdoor Module**  
 Manufacturer: **SmartLabs, Inc.**  
 Model: **2634-222**  
 S/N: **14.A2.F7**

Date: 10/16/2012  
 Time: 15:11:31  
 Sequence#: 9  
 Tested By: Don Nguyen  
 120V 60Hz

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP06084	Attenuator	SA18N10W-06	12/8/2010	12/8/2012
T2	ANP04358	Cable	RG142	4/10/2012	4/10/2014
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T3	AN02610	High Pass Filter	HE9615-150K-50-720B	11/21/2011	11/21/2013
	AN00847.1	50uH LISN-Line 1 (dB)	3816/2NM	12/21/2010	12/21/2012
T4	AN00847.1	50uH LISN-Line 2 (dB)	3816/2NM	12/21/2010	12/21/2012

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

**Support Devices:**

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

**Test Conditions / Notes:**

The EUT is placed on the wooden table. EUT is installed in fixed position. EUT is connected to support light bulb. The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

Frequency range of measurement = 150kHz-30MHz  
 RBW=VBW=9kHz

Test environment conditions: 24°C, 42% relative humidity, 100kPa  
 OATS: site A

Modification: Drop one fundamental power level.

Ext Attn: 0 dB

**Measurement Data:**

Reading listed by margin.

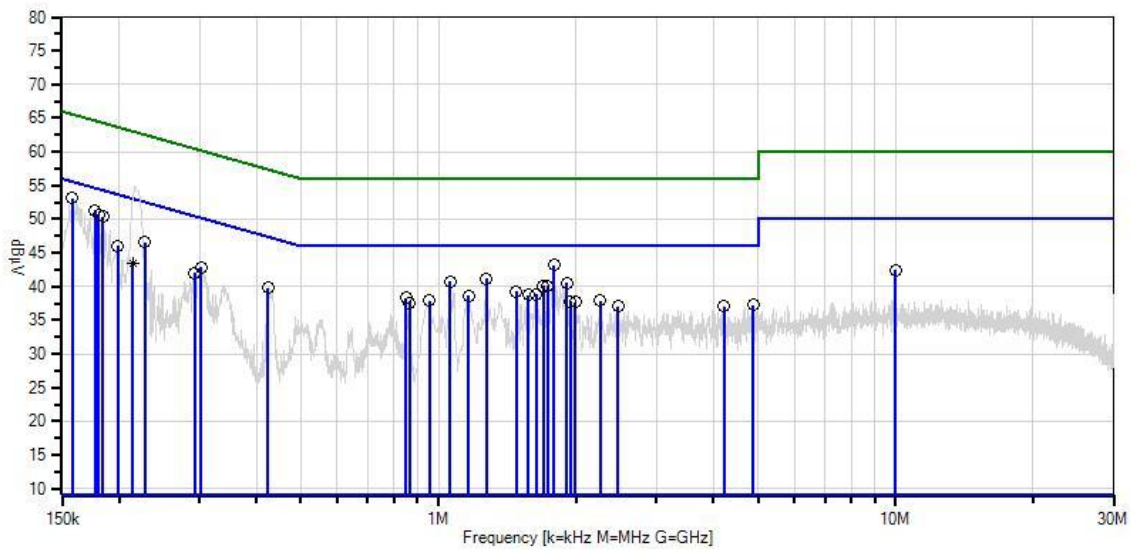
Test Lead: L2(N)

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	157.998k	46.5	+5.8	+0.0	+0.8	+0.0	+0.0	53.1	55.6	-2.5	L2(N)
2	1.787M	37.0	+5.8	+0.1	+0.2	+0.1	+0.0	43.2	46.0	-2.8	L2(N)
3	176.906k	45.1	+5.8	+0.0	+0.3	+0.0	+0.0	51.2	54.6	-3.4	L2(N)

4	180.542k	44.5	+5.8	+0.0	+0.3	+0.0	+0.0	50.6	54.5	-3.9	L2(N)
5	184.178k	44.3	+5.8	+0.0	+0.3	+0.0	+0.0	50.4	54.3	-3.9	L2(N)
6	1.273M	35.0	+5.8	+0.1	+0.2	+0.1	+0.0	41.2	46.0	-4.8	L2(N)
7	1.060M	34.7	+5.8	+0.1	+0.2	+0.0	+0.0	40.8	46.0	-5.2	L2(N)
8	1.906M	34.3	+5.8	+0.1	+0.2	+0.1	+0.0	40.5	46.0	-5.5	L2(N)
9	227.810k	40.6	+5.8	+0.0	+0.2	+0.0	+0.0	46.6	52.5	-5.9	L2(N)
10	1.698M	33.9	+5.8	+0.1	+0.2	+0.1	+0.0	40.1	46.0	-5.9	L2(N)
11	1.732M	33.9	+5.8	+0.1	+0.2	+0.1	+0.0	40.1	46.0	-5.9	L2(N)
12	1.481M	33.1	+5.8	+0.1	+0.2	+0.1	+0.0	39.3	46.0	-6.7	L2(N)
13	1.634M	32.7	+5.8	+0.1	+0.2	+0.1	+0.0	38.9	46.0	-7.1	L2(N)
14	1.575M	32.5	+5.8	+0.1	+0.2	+0.1	+0.0	38.7	46.0	-7.3	L2(N)
15	301.985k	36.9	+5.7	+0.1	+0.2	+0.0	+0.0	42.9	50.2	-7.3	L2(N)
16	1.162M	32.5	+5.8	+0.1	+0.2	+0.0	+0.0	38.6	46.0	-7.4	L2(N)
17	424.156k	33.8	+5.7	+0.1	+0.2	+0.0	+0.0	39.8	47.4	-7.6	L2(N)
18	10.004M	35.6	+5.8	+0.2	+0.2	+0.6	+0.0	42.4	50.0	-7.6	L2(N)
19	198.722k	40.0	+5.8	+0.0	+0.2	+0.0	+0.0	46.0	53.7	-7.7	L2(N)
20	848.117k	32.2	+5.8	+0.1	+0.2	+0.0	+0.0	38.3	46.0	-7.7	L2(N)
21	953.754k	31.8	+5.8	+0.1	+0.2	+0.0	+0.0	37.9	46.0	-8.1	L2(N)
22	2.259M	31.6	+5.8	+0.2	+0.2	+0.1	+0.0	37.9	46.0	-8.1	L2(N)
23	1.945M	31.6	+5.8	+0.1	+0.2	+0.1	+0.0	37.8	46.0	-8.2	L2(N)
24	1.996M	31.5	+5.8	+0.1	+0.2	+0.1	+0.0	37.7	46.0	-8.3	L2(N)
25	864.842k	31.5	+5.8	+0.1	+0.2	+0.0	+0.0	37.6	46.0	-8.4	L2(N)
26	292.531k	36.0	+5.7	+0.1	+0.2	+0.0	+0.0	42.0	50.5	-8.5	L2(N)
27	4.875M	31.0	+5.8	+0.2	+0.1	+0.2	+0.0	37.3	46.0	-8.7	L2(N)
28	2.468M	30.8	+5.8	+0.2	+0.2	+0.1	+0.0	37.1	46.0	-8.9	L2(N)

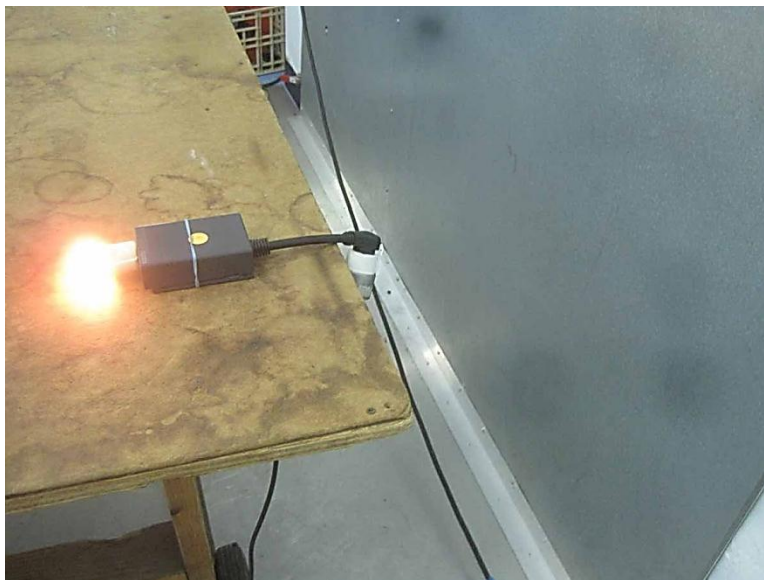
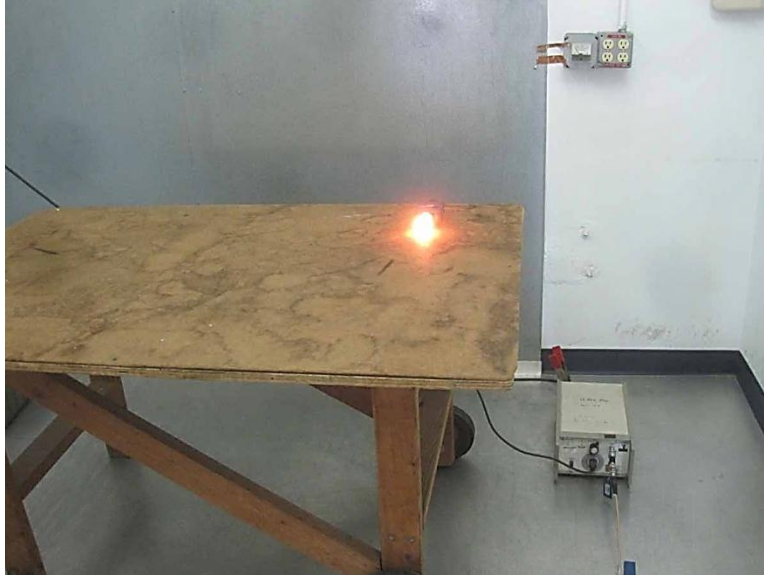
29	4.216M	30.8	+5.8	+0.2	+0.1	+0.2	+0.0	37.1	46.0	-8.9	L2(N)
30	214.161k	37.4	+5.8	+0.0	+0.2	+0.0	+0.0	43.4	53.0	-9.6	L2(N)
Ave											
^	216.902k	48.9	+5.8	+0.0	+0.2	+0.0	+0.0	54.9	52.9	+2.0	L2(N)
^	214.161k	48.6	+5.8	+0.0	+0.2	+0.0	+0.0	54.6	53.0	+1.6	L2(N)

CKC Laboratories, Inc. Date: 10/16/2012 Time: 15:11:31 SmartLabs, Inc. WO#: 93569  
 15.207 AC Mains - Average Test Lead: L2(N) 120V 60Hz Sequence#: 9 Ext ATTN: 0 dB



- Sweep Data
- Peak Readings
- \* Average Readings
- Readings
- × QP Readings
- ▼ Ambient
- 1 - 15.207 AC Mains - Average
- 2 - 15.207 AC Mains - Quasi-peak

**Test Setup Photos**



**15.249(a) RF Power Output**

**Test Conditions / Setup**  
**Test Data**

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**

Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**

Work Order #: **93569** Date: 10/16/2012

Test Type: **Maximized Emissions** Time: 11:24:57

Equipment: **On/Off Outdoor Module** Sequence#: 6

Manufacturer: SmartLabs, Inc. Tested By: Don Nguyen

Model: 2634-222

S/N: 14.A2.F7

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T2	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

**Support Devices:**

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

**Test Conditions / Notes:**

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is installed in fixed position. EUT is connected to support light bulb.

The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

Frequency range of measurement = fundamental

Test environment conditions: 22°C, 42% relative humidity, 100kPa

OATS: site A

Modification: Drop one fundamental power level.



Ext Attn: 0 dB

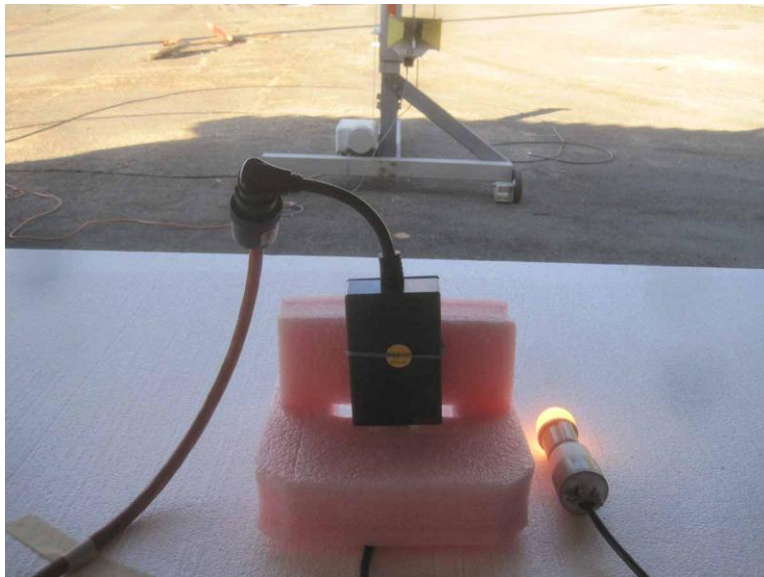
**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	915.090M	86.5	-27.2	+23.3	+0.5	+5.8	+0.0	88.9	94.0	-5.1	Vert
	QP										
^	915.090M	86.7	-27.2	+23.3	+0.5	+5.8	+0.0	89.1	94.0	-4.9	Vert
3	914.937M	86.5	-27.2	+23.3	+0.5	+5.8	+0.0	88.9	94.0	-5.1	Vert
	QP										
^	914.937M	86.7	-27.2	+23.3	+0.5	+5.8	+0.0	89.1	94.0	-4.9	Vert
5	915.089M	80.0	-27.2	+23.3	+0.5	+5.8	+0.0	82.4	94.0	-11.6	Horiz
6	914.934M	79.9	-27.2	+23.3	+0.5	+5.8	+0.0	82.3	94.0	-11.7	Horiz

**Test Setup Photos**



**-20dBc Occupied Bandwidth / RSS-210 99% Bandwidth**

**Test Conditions / Setup**

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**  
 Specification: **Occupied Bandwidth**  
 Work Order #: **93569** Date: 10/16/2012  
 Test Type: **Maximized Emissions** Time: 11:24:57  
 Equipment: **On/Off Outdoor Module** Sequence#: 6  
 Manufacturer: SmartLabs, Inc. Tested By: Don Nguyen  
 Model: 2634-222  
 S/N: NA

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T2	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

**Support Devices:**

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

**Test Conditions / Notes:**

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is installed in fixed position.  
 EUT is connected to support light bulb.  
 The EUT is set in constant transmit mode.

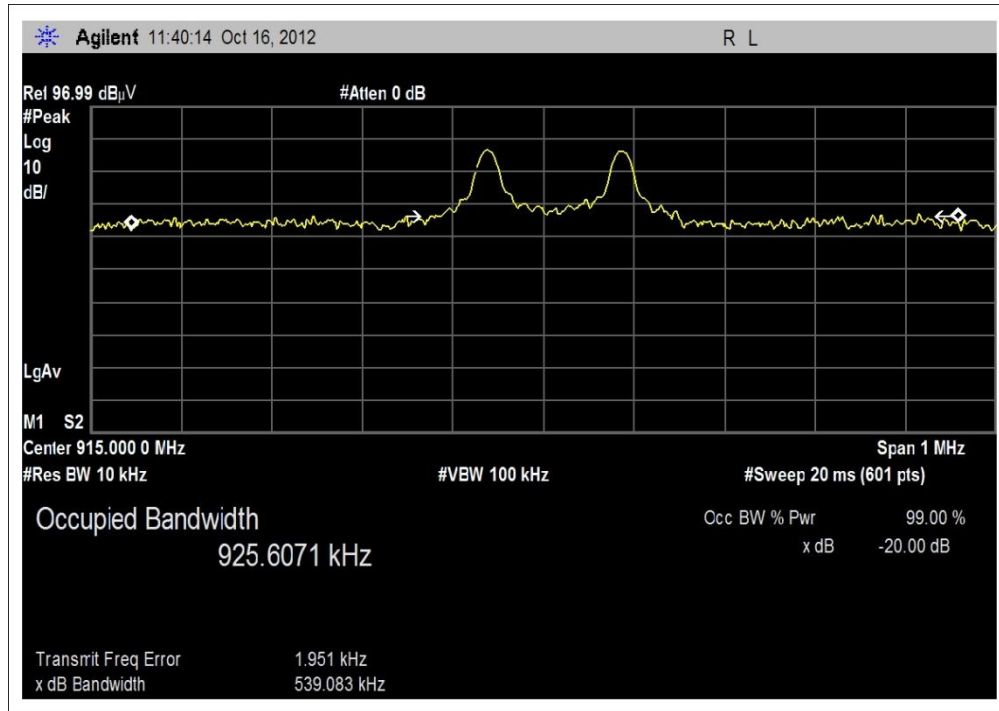
TX freq = 914.5-915.5 MHz

Frequency range of measurement = fundamental

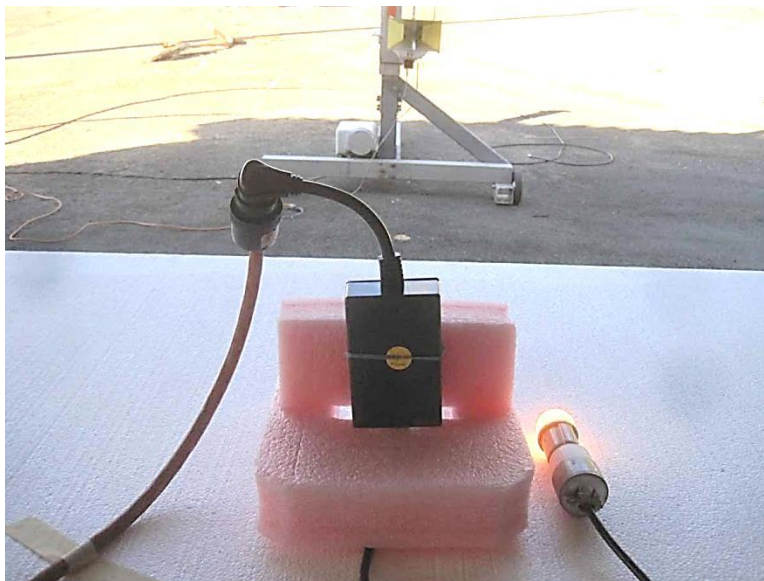
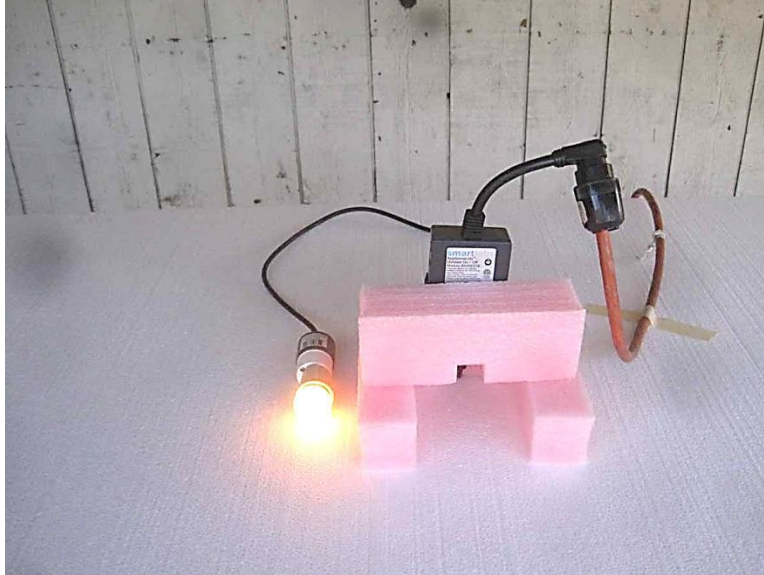
Test environment conditions: 22°C, 42% relative humidity, 100kPa  
 OATS: site A

Modification: Drop one fundamental power level.

Test Plots



**Test Setup Photos**



## Bandedge

### Test Conditions / Setup

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**

Specification: **Band Edge**

Work Order #: **93569**

Date: 10/16/2012

Test Type: **Maximized Emissions**

Time: 11:24:57

Equipment: **On/Off Outdoor Module**

Sequence#: 6

Manufacturer: SmartLabs, Inc.

Tested By: Don Nguyen

Model: 2634-222

S/N: NA

#### ***Test Equipment:***

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T2	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014

#### ***Equipment Under Test (\* = EUT):***

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

#### ***Support Devices:***

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

#### ***Test Conditions / Notes:***

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is installed in fixed position.

EUT is connected to support light bulb.

The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

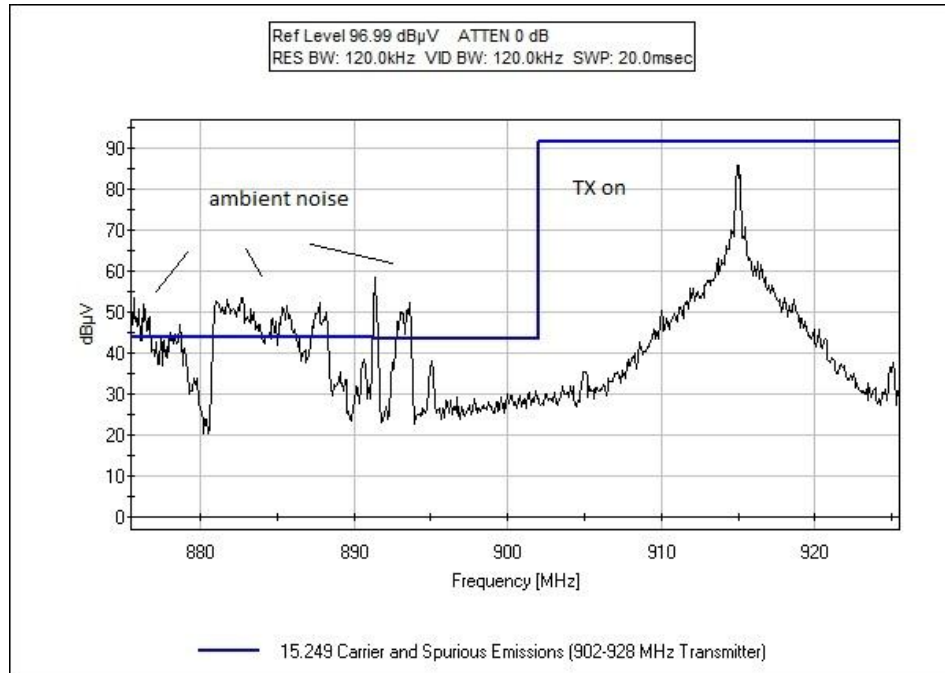
Frequency range of measurement = fundamental

Test environment conditions: 22°C, 42% relative humidity, 100kPa

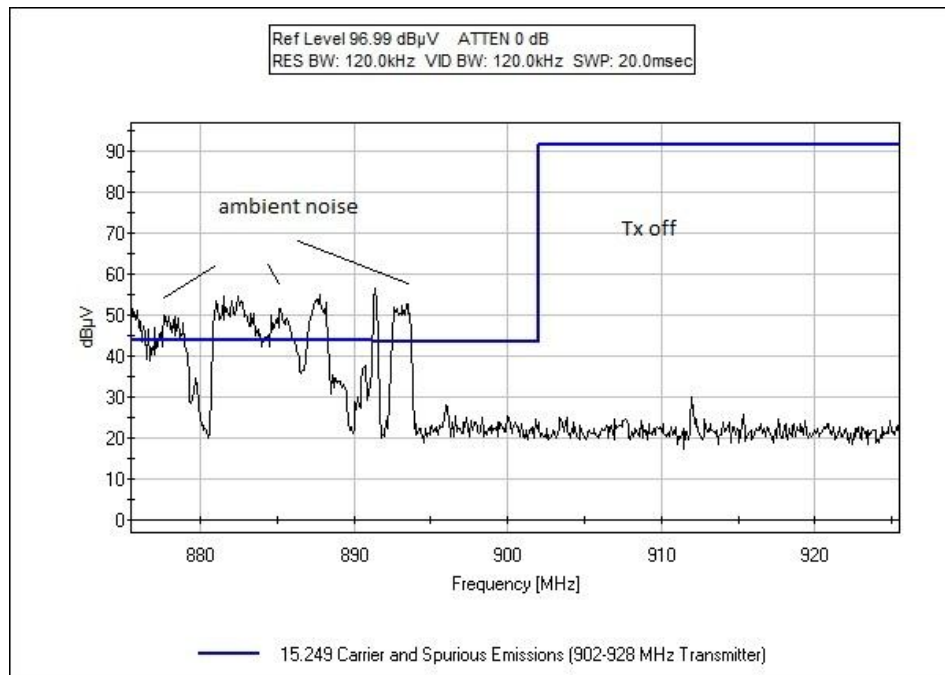
OATS: site A

Modification: Drop one fundamental power level.

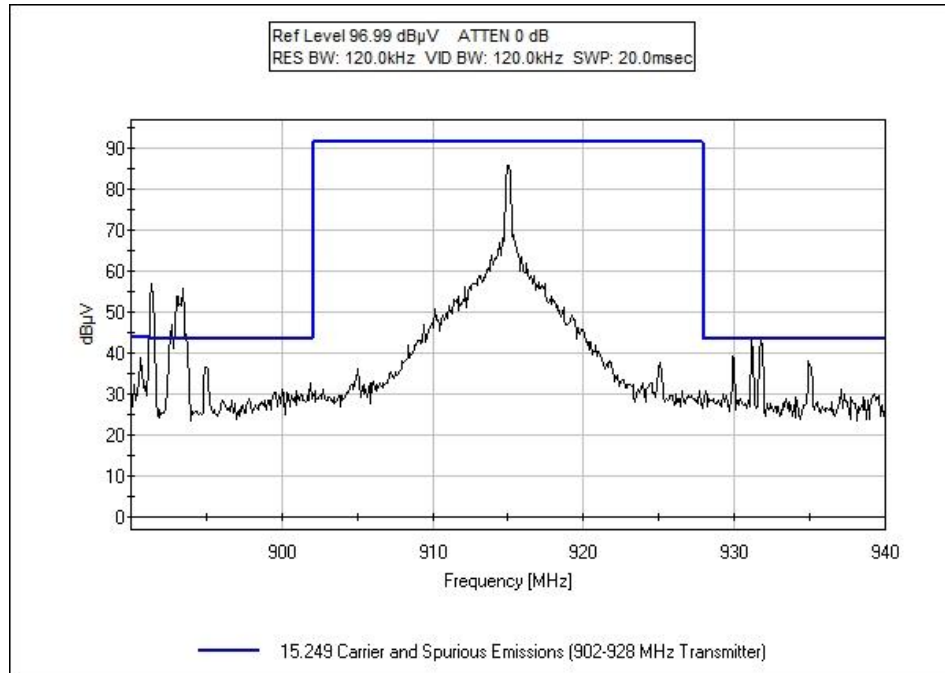
**Test Data**



Left TX ON

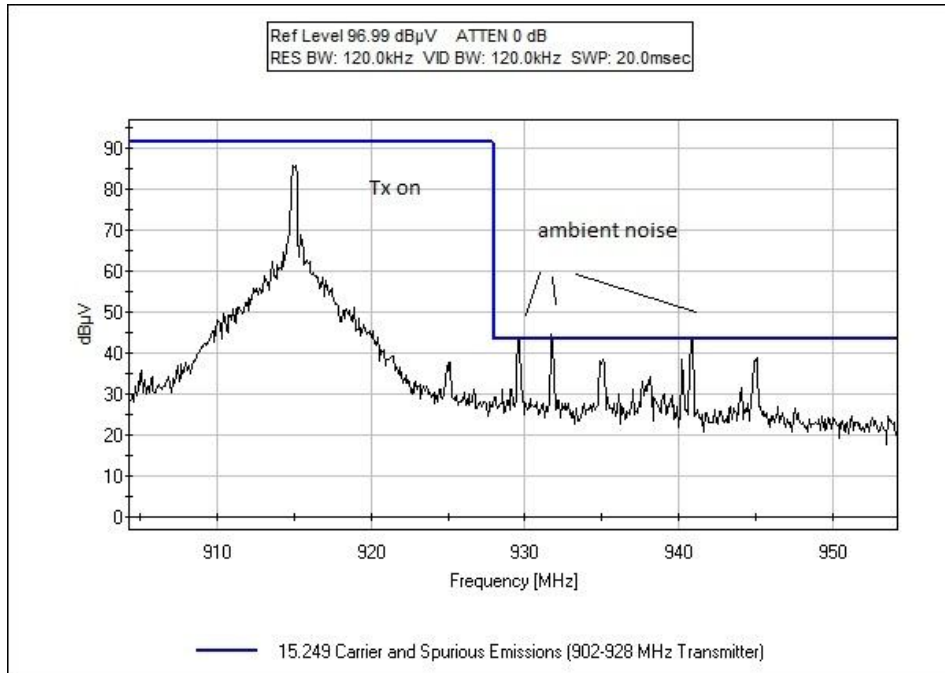


LEFT TX OFF

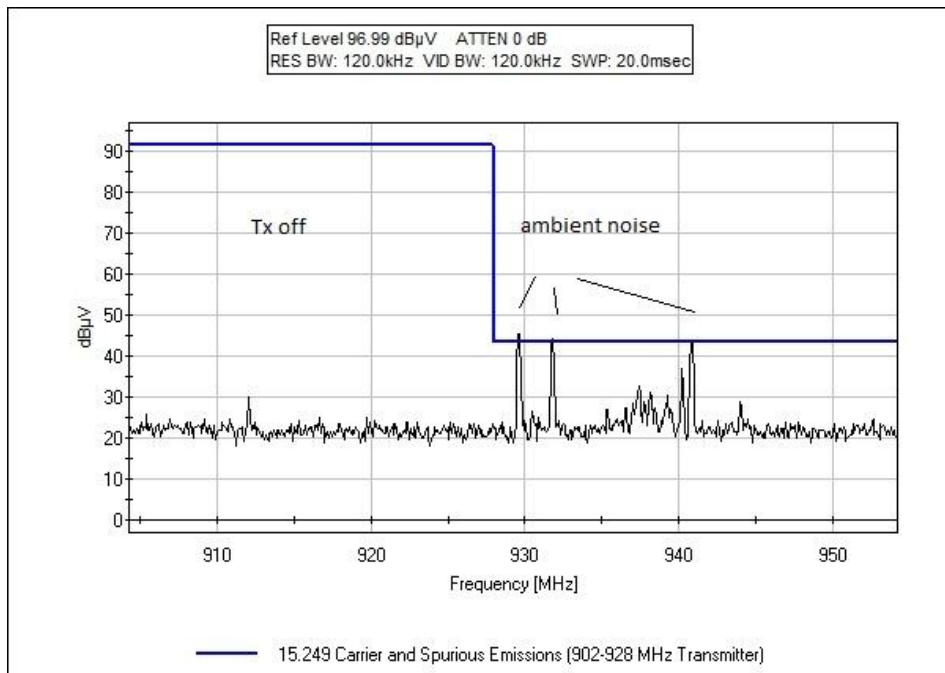


CENTER



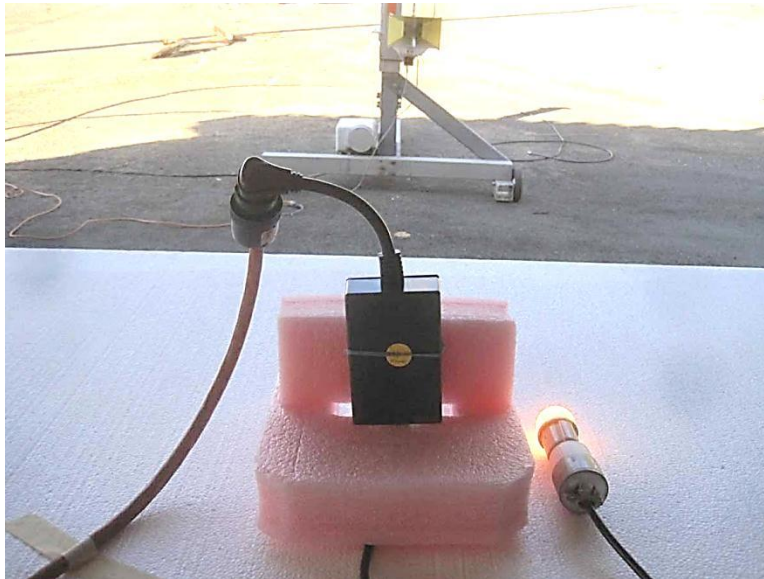
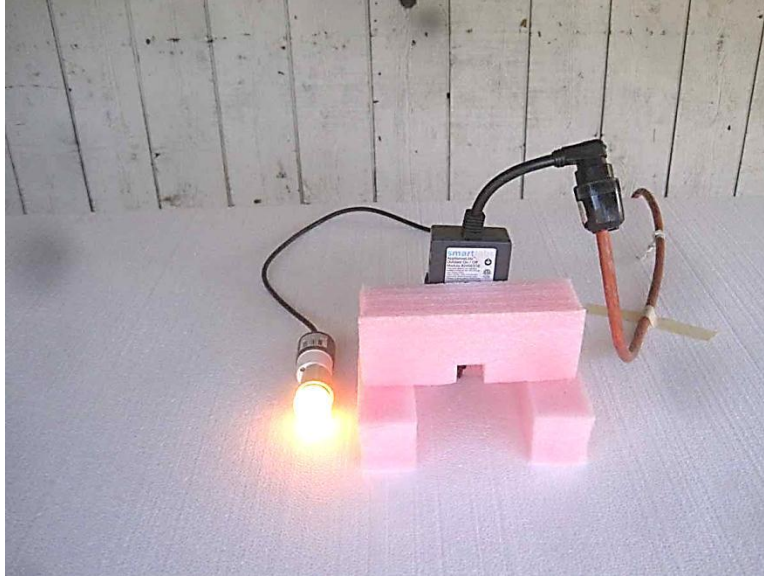


RIGHT TX ON



RIGHT TX OFF

**Test Setup Photos**



**15.249(d) Radiated Spurious Emissions**

**Test Data Sheets**

Test Location: CKC Laboratories, Inc. • 110 N. Olinda Place • Brea, CA 92823 • (714) 993-6112

Customer: **SmartLabs, Inc.**  
 Specification: **15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter)**  
 Work Order #: **93569** Date: 10/16/2012  
 Test Type: **Maximized Emissions** Time: 11:06:30  
 Equipment: **On/Off Outdoor Module** Sequence#: 5  
 Manufacturer: SmartLabs, Inc. Tested By: Don Nguyen  
 Model: 2634-222  
 S/N: 14.A2.F7

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN00309	Preamp	8447D	3/29/2012	3/29/2014
T2	AN01995	Biconilog Antenna	CBL6111C	5/16/2012	5/16/2014
T3	ANP05050	Cable	RG223/U	3/21/2011	3/21/2013
T4	ANP05198	Cable	8268	12/21/2010	12/21/2012
	AN02672	Spectrum Analyzer	E4446A	9/4/2012	9/4/2014
T5	AN00786	Preamp	83017A	6/20/2012	6/20/2014
T6	AN03239	Cable	32022-2-29094K-24TC	8/30/2011	8/30/2013
T7	ANP05421	Cable	Sucoflex 104A	2/8/2012	2/8/2014
T8	ANP05563	Cable	ANDL-1-PNMN-48	8/7/2012	8/7/2014
T9	AN03169	High Pass Filter	HM1155-11SS	9/22/2011	9/22/2013
T10	AN02113	Horn Antenna-ANSI C63.5	3115	1/17/2011	1/17/2013
T11	AN00314	Loop Antenna	6502	6/29/2012	6/29/2014

**Equipment Under Test (\* = EUT):**

Function	Manufacturer	Model #	S/N
On/Off Outdoor Module*	SmartLabs, Inc.	2634-222	14.A2.F7

**Support Devices:**

Function	Manufacturer	Model #	S/N
Light bulb	Sylvania	SYL 7.6W	NA

**Test Conditions / Notes:**

The EUT is placed on the wooden table lined with Styrofoam of 10 cm thickness. EUT is installed in fixed position. EUT is connected to support light bulb. The EUT is set in constant transmit mode.

TX freq = 914.5-915.5 MHz

Frequency range of measurement = 9kHz-10GHz  
 9 kHz -150 kHz; RBW=200 Hz, VBW=200 Hz;  
 150 kHz-30 MHz; RBW=9 kHz, VBW=9 kHz;  
 30 MHz-1000 MHz; RBW=120 kHz, VBW=120 kHz,  
 1000 MHz-10000 MHz; RBW=1 MHz, VBW=1 MHz.

Test environment conditions: 22°C, 42% relative humidity, 100kPa  
 OATS: site A

Modification: Drop one fundamental power level.

Ext Attn: 0 dB

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

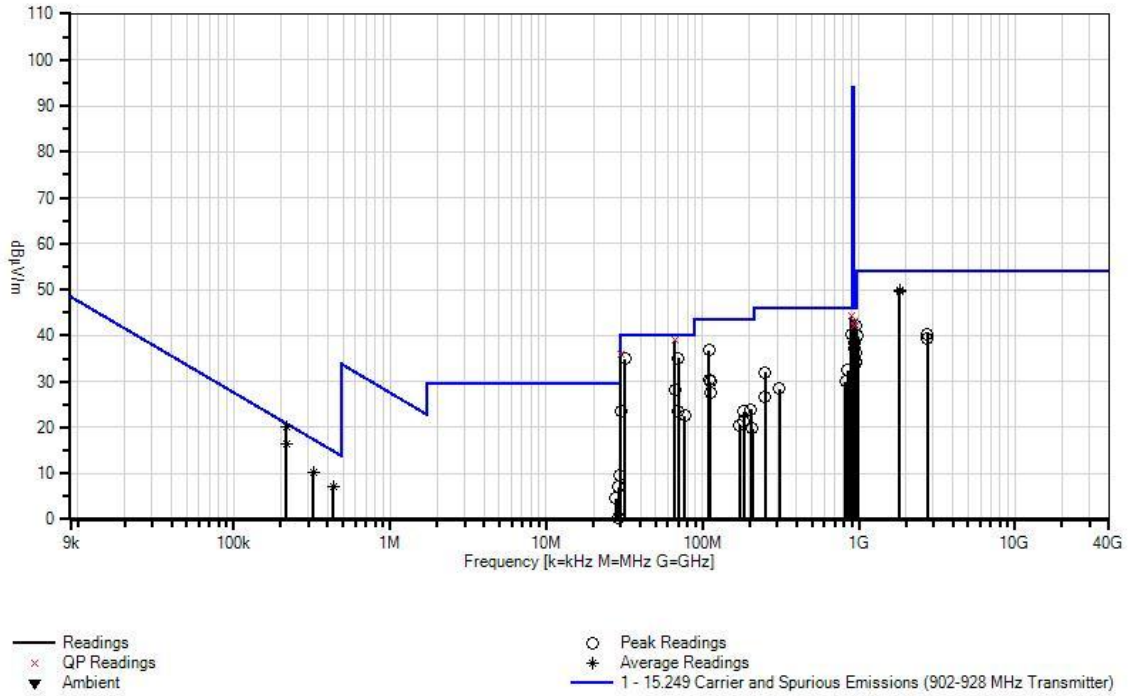
#	Freq MHz	Rdng dBµV	Reading listed by margin					Dist Table	Corr dBµV/m	Spec dBµV/m	Margin dB	Polar Ant
			T1 dB	T2 dB	T3 dB	T4 dB	T5 dB					
1	216.000k Ave	50.8	+0.0	+0.0	+0.0	+0.1	-40.0	20.0	20.9	-0.9	Paral	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+9.1							
^	216.000k	53.9	+0.0	+0.0	+0.0	+0.1	-40.0	23.1	20.9	+2.2	Paral	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+9.1							
3	66.362M QP	59.6	-28.1	+6.0	+0.1	+1.4	+0.0	39.0	40.0	-1.0	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
^	66.362M	60.6	-28.1	+6.0	+0.1	+1.4	+0.0	40.0	40.0	+0.0	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
5	895.092M QP	41.9	-27.2	+23.2	+0.5	+5.8	+0.0	44.2	46.0	-1.8	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
^	895.092M	42.8	-27.2	+23.2	+0.5	+5.8	+0.0	45.1	46.0	-0.9	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
7	944.943M QP	40.6	-27.3	+23.4	+0.5	+5.9	+0.0	43.1	46.0	-2.9	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
^	944.943M	41.6	-27.3	+23.4	+0.5	+5.9	+0.0	44.1	46.0	-1.9	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
9	934.945M QP	39.7	-27.3	+23.4	+0.5	+5.9	+0.0	42.2	46.0	-3.8	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							
^	934.945M	41.3	-27.3	+23.4	+0.5	+5.9	+0.0	43.8	46.0	-2.2	Vert	
			+0.0	+0.0	+0.0	+0.0						
			+0.0	+0.0	+0.0							

11	30.070M QP	45.4	-28.1 +0.0 +0.0	+17.7 +0.0 +0.0	+0.1 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0	36.0	40.0	-4.0	Vert
^	30.070M	48.2	-28.1 +0.0 +0.0	+17.7 +0.0 +0.0	+0.1 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0	38.8	40.0	-1.2	Vert
13	1830.033M Ave	58.0	+0.0 -38.5 +0.4	+0.0 +0.3 +25.7	+0.0 +1.1 +0.0	+0.0 +2.8	+0.0	49.8	54.0	-4.2	Horiz
^	1830.033M	59.6	+0.0 -38.5 +0.4	+0.0 +0.3 +25.7	+0.0 +1.1 +0.0	+0.0 +2.8	+0.0	51.4	54.0	-2.6	Horiz
15	1830.083M Ave	57.8	+0.0 -38.5 +0.4	+0.0 +0.3 +25.7	+0.0 +1.1 +0.0	+0.0 +2.8	+0.0	49.6	54.0	-4.4	Vert
^	1830.083M	60.0	+0.0 -38.5 +0.4	+0.0 +0.3 +25.7	+0.0 +1.1 +0.0	+0.0 +2.8	+0.0	51.8	54.0	-2.2	Vert
17	216.000k Ave	47.2	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	16.4	20.9	-4.5	Perpe
^	216.000k	51.2	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	20.4	20.9	-0.5	Perpe
19	70.037M	55.6	-28.1 +0.0 +0.0	+6.1 +0.0 +0.0	+0.1 +0.0 +0.0	+1.4 +0.0 +0.0	+0.0	35.1	40.0	-4.9	Vert
20	31.987M	45.1	-28.1 +0.0 +0.0	+16.9 +0.0 +0.0	+0.1 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0	34.9	40.0	-5.1	Vert
21	894.950M	37.9	-27.2 +0.0 +0.0	+23.2 +0.0 +0.0	+0.5 +0.0 +0.0	+5.8 +0.0 +0.0	+0.0	40.2	46.0	-5.8	Horiz
22	109.987M	52.1	-28.0 +0.0 +0.0	+10.8 +0.0 +0.0	+0.1 +0.0 +0.0	+1.8 +0.0 +0.0	+0.0	36.8	43.5	-6.7	Vert
23	321.500k Ave	41.1	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	10.3	17.5	-7.2	Paral
^	321.500k	49.7	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	18.9	17.5	+1.4	Paral
25	944.935M	35.8	-27.3 +0.0 +0.0	+23.4 +0.0 +0.0	+0.5 +0.0 +0.0	+5.9 +0.0 +0.0	+0.0	38.3	46.0	-7.7	Horiz
26	430.917k Ave	37.9	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	7.1	14.9	-7.8	Paral
^	430.917k	43.6	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +9.1	+0.1 +0.0 +0.0	-40.0	12.8	14.9	-2.1	Paral

28	934.960M	34.7	-27.3 +0.0 +0.0	+23.4 +0.0 +0.0	+0.5 +0.0 +0.0	+5.9 +0.0 +0.0	+0.0	37.2	46.0	-8.8	Horiz
29	955.110M	33.8	-27.3 +0.0 +0.0	+23.5 +0.0 +0.0	+0.5 +0.0 +0.0	+5.9 +0.0 +0.0	+0.0	36.4	46.0	-9.6	Vert
30	66.350M	48.9	-28.1 +0.0 +0.0	+6.0 +0.0 +0.0	+0.1 +0.0 +0.0	+1.4 +0.0 +0.0	+0.0	28.3	40.0	-11.7	Horiz
31	965.090M	39.4	-27.3 +0.0 +0.0	+23.5 +0.0 +0.0	+0.5 +0.0 +0.0	+6.0 +0.0 +0.0	+0.0	42.1	54.0	-11.9	Vert
32	959.160M	31.3	-27.3 +0.0 +0.0	+23.5 +0.0 +0.0	+0.5 +0.0 +0.0	+6.0 +0.0 +0.0	+0.0	34.0	46.0	-12.0	Vert
33	109.995M	45.6	-28.0 +0.0 +0.0	+10.8 +0.0 +0.0	+0.1 +0.0 +0.0	+1.8 +0.0 +0.0	+0.0	30.3	43.5	-13.2	Horiz
34	112.287M	45.0	-28.0 +0.0 +0.0	+11.0 +0.0 +0.0	+0.2 +0.0 +0.0	+1.8 +0.0 +0.0	+0.0	30.0	43.5	-13.5	Vert
35	844.950M	30.7	-27.2 +0.0 +0.0	+22.9 +0.0 +0.0	+0.5 +0.0 +0.0	+5.6 +0.0 +0.0	+0.0	32.5	46.0	-13.5	Horiz
36	845.092M	30.6	-27.2 +0.0 +0.0	+22.9 +0.0 +0.0	+0.5 +0.0 +0.0	+5.6 +0.0 +0.0	+0.0	32.4	46.0	-13.6	Vert
37	2745.083M	44.5	+0.0 -38.7 +0.3	+0.0 +0.4 +29.0	+0.0 +1.4 +0.0	+0.0 +3.4	+0.0	40.3	54.0	-13.7	Vert
38	251.710M	44.4	-27.8 +0.0 +0.0	+12.4 +0.0 +0.0	+0.2 +0.0 +0.0	+2.8 +0.0 +0.0	+0.0	32.0	46.0	-14.0	Horiz
39	985.090M	36.9	-27.3 +0.0 +0.0	+23.6 +0.0 +0.0	+0.6 +0.0 +0.0	+6.1 +0.0 +0.0	+0.0	39.9	54.0	-14.1	Vert
40	2745.017M	43.7	+0.0 -38.7 +0.3	+0.0 +0.4 +29.0	+0.0 +1.4 +0.0	+0.0 +3.4	+0.0	39.5	54.0	-14.5	Horiz
41	112.035M	42.7	-28.0 +0.0 +0.0	+11.0 +0.0 +0.0	+0.2 +0.0 +0.0	+1.8 +0.0 +0.0	+0.0	27.7	43.5	-15.8	Horiz
42	825.110M	28.4	-27.2 +0.0 +0.0	+22.8 +0.0 +0.0	+0.5 +0.0 +0.0	+5.5 +0.0 +0.0	+0.0	30.0	46.0	-16.0	Horiz
43	70.025M	44.1	-28.1 +0.0 +0.0	+6.1 +0.0 +0.0	+0.1 +0.0 +0.0	+1.4 +0.0 +0.0	+0.0	23.6	40.0	-16.4	Horiz
44	30.000M	32.9	-28.1 +0.0 +0.0	+17.7 +0.0 +0.0	+0.1 +0.0 +0.0	+0.9 +0.0 +0.0	+0.0	23.5	40.0	-16.5	Horiz

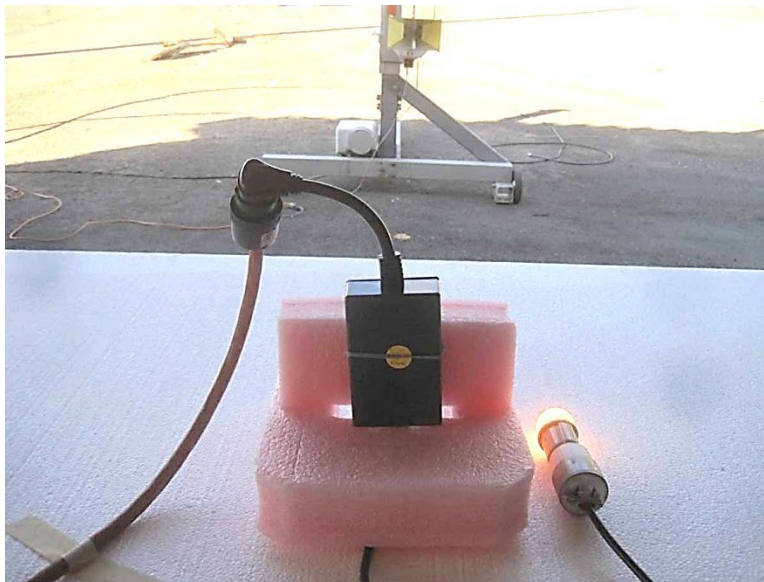
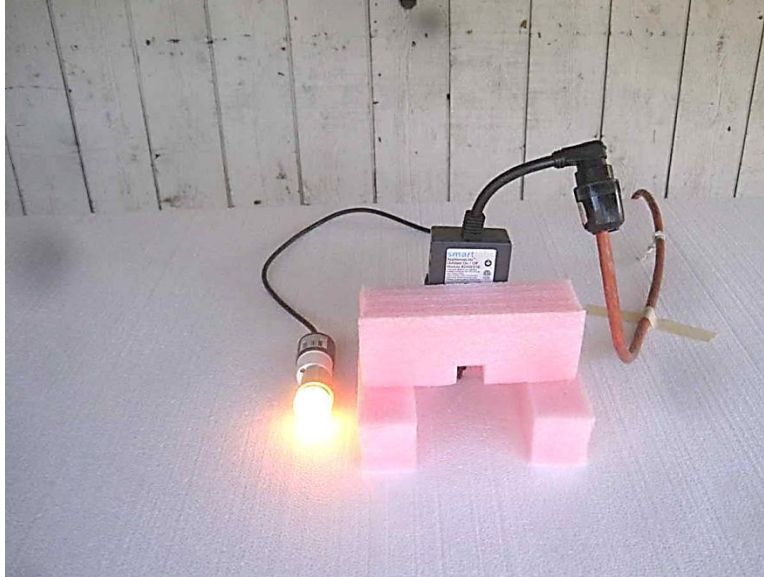
45	76.712M	42.1	-28.1 +0.0 +0.0	+7.0 +0.0 +0.0	+0.1 +0.0 +0.0	+1.5 +0.0 +0.0	+0.0	22.6	40.0	-17.4	Vert
46	309.700M	39.6	-27.8 +0.0 +0.0	+13.4 +0.0 +0.0	+0.2 +0.0 +0.0	+3.1 +0.0 +0.0	+0.0	28.5	46.0	-17.5	Horiz
47	251.040M	38.9	-27.8 +0.0 +0.0	+12.4 +0.0 +0.0	+0.2 +0.0 +0.0	+2.8 +0.0 +0.0	+0.0	26.5	46.0	-19.5	Vert
48	204.860M	39.6	-27.9 +0.0 +0.0	+9.5 +0.0 +0.0	+0.2 +0.0 +0.0	+2.5 +0.0 +0.0	+0.0	23.9	43.5	-19.6	Horiz
49	965.085M	31.6	-27.3 +0.0 +0.0	+23.5 +0.0 +0.0	+0.5 +0.0 +0.0	+6.0 +0.0 +0.0	+0.0	34.3	54.0	-19.7	Horiz
50	184.310M	39.7	-27.9 +0.0 +0.0	+9.1 +0.0 +0.0	+0.2 +0.0 +0.0	+2.4 +0.0 +0.0	+0.0	23.5	43.5	-20.0	Horiz
51	29.770M	23.4	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +5.2	+0.9 +0.0 +0.0	-20.0	9.5	29.5	-20.0	Perpe
52	184.290M	37.5	-27.9 +0.0 +0.0	+9.1 +0.0 +0.0	+0.2 +0.0 +0.0	+2.4 +0.0 +0.0	+0.0	21.3	43.5	-22.2	Vert
53	29.050M	20.9	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +5.3	+0.9 +0.0 +0.0	-20.0	7.1	29.5	-22.4	Perpe
54	172.635M	36.2	-27.9 +0.0 +0.0	+9.6 +0.0 +0.0	+0.2 +0.0 +0.0	+2.3 +0.0 +0.0	+0.0	20.4	43.5	-23.1	Horiz
55	209.190M	35.2	-27.9 +0.0 +0.0	+9.8 +0.0 +0.0	+0.2 +0.0 +0.0	+2.5 +0.0 +0.0	+0.0	19.8	43.5	-23.7	Vert
56	27.815M	18.2	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +5.4	+0.9 +0.0 +0.0	-20.0	4.5	29.5	-25.0	Perpe
57	29.030M	14.2	+0.0 +0.0 +0.0	+0.0 +0.0 +0.0	+0.0 +0.0 +5.3	+0.9 +0.0 +0.0	-20.0	0.4	29.5	-29.1	Paral

CKC Laboratories, Inc. Date: 10/16/2012 Time: 11:06:30 SmartLabs, Inc. WO#: 93569  
 15.249 Carrier and Spurious Emissions (902-928 MHz Transmitter) Test Distance: 3 Meters Sequence#: 5 Ext  
 ATTN: 0 dB





**Test Setup Photos**



## SUPPLEMENTAL INFORMATION

### Measurement Uncertainty

Uncertainty Value	Parameter
4.73 dB	Radiated Emissions
3.34 dB	Mains Conducted Emissions
3.30 dB	Disturbance Power

The reported measurement uncertainties are calculated based on the worst case of all laboratory environments from CKC Laboratories, Inc. test sites. Only those parameters which require estimation of measurement uncertainty are reported. The reported worst case measurement uncertainty is less than the maximum values derived in CISPR 16-4-2. Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Compliance is deemed to occur provided measurements are below the specified limits.

### Emissions Test Details

**TESTING PARAMETERS**

Unless otherwise indicated, the following configuration parameters are used for equipment setup: The cables were routed consistent with the typical application by varying the configuration of the test sample. Interface cables were connected to the available ports of the test unit. The effect of varying the position of the cables was investigated to find the configuration that produced maximum emissions. Cables were of the type and length specified in the individual requirements. The length of cable that produced maximum emissions was selected.

The equipment under test (EUT) was set up in a manner that represented its normal use, as shown in the setup photographs. Any special conditions required for the EUT to operate normally are identified in the comments that accompany the emissions tables.

The emissions data was taken with a spectrum analyzer or receiver. Incorporating the applicable correction factors for distance, antenna, cable loss and amplifier gain, the data was reduced as shown in the table below. The corrected data was then compared to the applicable emission limits. Preliminary and final measurements were taken in order to ensure that all emissions from the EUT were found and maximized.

**CORRECTION FACTORS**

The basic spectrum analyzer reading was converted using correction factors as shown in the highest emissions readings in the tables. For radiated emissions in dBμV/m, the spectrum analyzer reading in dBμV was corrected by using the following formula. This reading was then compared to the applicable specification limit.

SAMPLE CALCULATIONS		
	Meter reading	(dB $\mu$ V)
+	Antenna Factor	(dB)
+	Cable Loss	(dB)
-	Distance Correction	(dB)
-	Preamplifier Gain	(dB)
=	Corrected Reading	(dB $\mu$ V/m)

### TEST INSTRUMENTATION AND ANALYZER SETTINGS

The test instrumentation and equipment listed were used to collect the emissions data. A spectrum analyzer or receiver was used for all measurements. Unless otherwise specified, the following table shows the measuring equipment bandwidth settings that were used in designated frequency bands. For testing emissions, an appropriate reference level and a vertical scale size of 10 dB per division were used.

MEASURING EQUIPMENT BANDWIDTH SETTINGS PER FREQUENCY RANGE			
TEST	BEGINNING FREQUENCY	ENDING FREQUENCY	BANDWIDTH SETTING
CONDUCTED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	9 kHz	150 kHz	200 Hz
RADIATED EMISSIONS	150 kHz	30 MHz	9 kHz
RADIATED EMISSIONS	30 MHz	1000 MHz	120 kHz
RADIATED EMISSIONS	1000 MHz	>1 GHz	1 MHz

### SPECTRUM ANALYZER/RECEIVER DETECTOR FUNCTIONS

The notes that accompany the measurements contained in the emissions tables indicate the type of detector function used to obtain the given readings. Unless otherwise noted, all readings were made in the "positive peak" detector mode. Whenever a "quasi-peak" or "average" reading was recorded, the measurement was annotated with a "QP" or an "Ave" on the appropriate rows of the data sheets. In cases where quasi-peak or average limits were employed and data exists for multiple measurement types for the same frequency then the peak measurement was retained in the report for reference, however the numbering for the affected row was removed and an arrow or carrot ("^") was placed in the far left-hand column indicating that the row above takes precedence for comparison to the limit. The following paragraphs describe in more detail the detector functions and when they were used to obtain the emissions data.

#### Peak

In this mode, the spectrum analyzer or receiver recorded all emissions at their peak value as the frequency band selected was scanned. By combining this function with another feature called "peak hold," the measurement device had the ability to measure intermittent or low duty cycle transient emission peak levels. In this mode the measuring device made a slow scan across the frequency band selected and measured the peak emission value found at each frequency across the band.

#### Quasi-Peak

Quasi-peak measurements were taken using the quasi-peak detector when the true peak values exceeded or were within 2 dB of a quasi-peak specification limit. Additional QP measurements may have been taken at the discretion of the operator.

#### Average

Average measurements were taken using the average detector when the true peak values exceeded or were within 2 dB of an average specification limit. Additional average measurements may have been taken at the discretion of the operator. If the specification or test procedure requires trace averaging, then the averaging was performed using 100 samples or as required by the specification. All other average measurements are performed using video bandwidth averaging. To make these measurements, the test engineer reduces the video bandwidth on the measuring device until the modulation of the signal is filtered out. At this point the measuring device is set into the linear mode and the scan time is reduced.